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“पुराने को छोड़ नये के तरफ”

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IS 10211-2 (1982): Standard Signal Generator in the Frequency Range 30 Mhz to 500 Mhz, Part 2: Performance Requirements [LITD 8: Electronic Measuring Instruments, Systems and Accessories]



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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

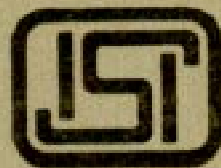
“Knowledge is such a treasure which cannot be stolen”

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Indian Standard
SPECIFICATION FOR
STANDARD SIGNAL GENERATOR
IN THE FREQUENCY RANGE
30 MHz to 500 MHz
PART II PERFORMANCE REQUIREMENTS

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INDIAN STANDARDS INSTITUTION
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NEW DELHI 110002

Indian Standard
SPECIFICATION FOR
STANDARD SIGNAL GENERATOR
IN THE FREQUENCY RANGE
30 MHz to 500 MHz

PART II PERFORMANCE REQUIREMENTS

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Indian Standard
SPECIFICATION FOR
STANDARD SIGNAL GENERATOR
IN THE FREQUENCY RANGE
30 MHz to 500 MHz

PART II PERFORMANCE REQUIREMENTS

0. FOREWORD

0.1 This Indian Standard (Part II) was adopted by the Indian Standards Institution on 22 June 1982, after the draft finalized by the Electronic Measuring Equipment Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 The signal generator is widely used as testing instrument in electronic engineering and allied fields. In view of the rapid expansion of electronic industry in the country, the demand for each instrument has been on the increase. The need, therefore, has been felt for laying down minimum requirements of such instruments which would serve as a guide to the manufacturers and the users.

0.3 The object of this standard (Part II) is to specify the minimum requirements for the performance characteristics of signal generator in the frequency range 30 MHz to 500 MHz.

0.3.1 The requirements relating to climatic and mechanical tests are under consideration. With regard to safety requirements, the signal generator should satisfy the requirements specified in IS:616-1981* so far as applicable.

0.4 This standard (Part II) shall be read in conjunction with IS:10211 (Part I)-1982†.

0.5 The provisions of the standard apply to complete apparatus and not to component parts thereof.

*Safety requirements for mains operated electronic and related apparatus for household and similar general use (*first revision*).

†Standard signal generator in the frequency range 30 MHz to 500 MHz: Part I Methods of measurements.

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0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part II) lays down the minimum performance requirements and characteristics to be specified for standard signal generator in the frequency range of 30 MHz to 500 MHz.

1.1.1 This standard covers requirements for synthesised type signal generators only. The requirements for phase locked looped version shall be covered in subsequent part.

2. TERMINOLOGY

2.1 For the purpose of this Standard, the definitions and explanation of the terms given in 2 of IS:10211 (Part I)-1982† shall apply.

3. GENERAL CONDITIONS FOR MEASUREMENTS

3.1 The performance requirements specified in this standard shall be measured in accordance with IS:10211 (Part I)-1982†.

3.2 Supply Voltage

3.2.1 The normal supply voltage at rated frequency shall be applied to the generator.

3.2.2 The operating mains voltage applied to the generator shall be held constant within ± 10 percent of the rated value during the measurement of the characteristics.

4. MINIMUM PERFORMANCE REQUIREMENTS

4.0 The standard signal generator shall comply with the minimum requirements given below, under standard test conditions as given in IS:10211 (Part I)-1982†.

4.1 Frequency Characteristics

4.1.1 Frequency Range — The frequency range shall be 30 MHz to 500 MHz covered in convenient frequency bands.

*Rules for rounding off numerical values (*revised*).

†Standard signal generator in the frequency range 30 MHz to 500 MHz: Part I Methods of measurements.

4.1.2 Frequency Dial Accuracy — The accuracy of the dial shall be 1 percent or better.

4.1.3 Dial Resolution — The resolution of the dial shall be 0.5 percent of the setting.

4.1.4 Frequency Stability — After warm up of 2 hours, the frequency stability shall be within 20 ppm during 10 minutes interval.

4.2 Spectral Purity

4.2.1 Harmonics — Harmonics shall be more than 30 dB below the fundamental, over the complete frequency range.

4.2.2 Spurious — Spurious signals shall be more than 80 dB below the fundamental, over the frequency range.

4.2.3 Residual FM — With telephone psophometric weighing network, the equivalent deviation shall be less than 60 Hz.

4.2.4 Residual AM — With telephone psophometric weighing network, the equivalent AM shall be less than 0.2 percent modulation depth.

4.3 Output Characteristics

4.3.1 Output Level Range — Output voltage range shall be from 0.2 μ V to 2 V emf. Output level dial shall be calibrated both in voltage and dbm.

4.3.2 Output Level Flatness — The output level flatness shall be ± 0.5 dB from 30 MHz to 500 MHz.

4.3.3 Source Impedance — The output (source) impedance shall be 50 ohms and VSWR better than 1.3 at any setting of the internal attenuator.

4.3.4 Output Attenuator — The output attenuator shall have the following characteristics:

- a) Coarse — 10 dB step attenuator, and
- b) Fine — 0 to 10 dB continuously variable calibrated attenuator.

4.3.5 Overall Output Level Accuracy — The output level accuracy shall be as follows:

- a) ± 1 dB up to 100 MHz, and
- b) ± 2 dB up to 500 MHz.

This comprises attenuator error and setting error.

4.3.6 Leakage Radiation — The induced voltage shall be less than minimum output of signal generator when measured with 50 ohms receiver in a 2 turn 2.54 cm diameter loop, 2.54 cm away from any surface of the generator, to allow measurement on receivers up to 0.1 μ V sensitivity.

4.3.7 Reverse Power Protection — A protection circuit shall be incorporated in the signal generator, which provides complete burn-out protection to the attenuator against RF signals up to a maximum of 2 watts accidentally applied at the output terminals.

4.4 Modulation Characteristics

4.4.1 Amplitude Modulation

4.4.1.1 Depth — The depth of modulation shall be 0 to 100 percent continuously variable and indicated through a calibrated panel control.

4.4.1.2 Depth calibration accuracy — The depth calibration accuracy shall be better than ± 5 percent of reading.

4.4.1.3 Envelope distortion — The envelope distortion shall be less than 5 percent up to modulation depth of 30 percent and less than 8 percent up to 80 percent.

4.4.1.4 Internal modulation — The internal modulation frequency selected by a switch shall be as follows:

- i) 1 KHz ± 10 percent; and
- ii) 400 Hz ± 10 percent.

4.4.1.5 External 3 dB AM bandwidth shall be between 50 Hz to 20 KHz.

4.4.1.6 Minimum external level required to cover the modulation range shall be 1.5 volts.

4.4.1.7 Incidental FM — With telephone psophometric weighing, deviation shall be less than 500 Hz with 30 percent AM at 1 KHz.

4.4.2 Frequency Modulation

4.4.2.1 Deviation shall be continuously variable from 0 to 100 KHz and indicated through a calibrated panel control.

4.4.2.2 Deviation indication accuracy shall be ± 10 percent at 1 KHz modulating frequency.

4.4.2.3 Distortion shall be less than 3 percent up to the maximum allowed deviation.

4.4.2.4 Internal modulation frequency selected by a switch shall be as follows:

- i) 1 KHz ± 10 percent; and
- ii) 400 Hz ± 10 percent.

4.4.2.5 External FM 3 dB bandwidth shall be dc, to 100 KHz.

4.4.2.6 Minimum external signal required to cover the full modulation range shall be 1.5 volts.

4.4.2.7 Incidental AM — With telephone psophometric weighing at 30 KHz deviation, the AM depth shall be less than 3 percent.

5. MARKING

5.1 Unless otherwise specified, the following information shall be marked on the signal generator indelibly and externally visible:

- a) Serial number, and model designation;
- b) Frequency range;
- c) Name and trade-mark of the manufacturer; and
- d) Country of manufacture.

5.2 The following information shall be clearly specified in the manual or in the printed label of adequate size affixed to one of the inner faces of the cabinet or back cover:

- a) Type of supply and the operating voltage,
- b) Maximum power consumption in the case of mains-operated signal generators or maximum current range in the case of battery-operated signal generators,
- c) Plan of the chassis showing the location of the components, and
- d) Any other information or caution which the manufacturer may consider necessary.

5.3 The signal generator may also be marked with the ISI Certification Mark.

NOTE—The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. TECHNICAL DOCUMENTATION TO BE SUPPLIED BY THE MANUFACTURER

6.1 A technical document shall be supplied by the manufacturer with each instrument, which shall be prepared in accordance with IS:6756-1972*. All the information given in 4 of IS:6756-1972* shall be fully described in the technical document together with the following:

- a) Power supply requirements;
- b) Warm-up period to attain overall stability;
- c) Source impedance (output impedance);
- d) The type of output, namely, balanced or unbalanced;
- e) Any other information or caution which the manufacturer may consider necessary;
- f) Storage conditions; and
- g) Transport conditions.

6.1.1 It shall also contain a complete list of parts, spares and accessories supplied or recommended for use along with a circuit diagram, operating, servicing and maintenance instructions.

*Technical documentation to be supplied with electronic measuring equipment.